NEUROSCIENCE

An International Journal under the editorial direction of IBRO

Volume 23, 1987

TITLE SECTION
LIST OF CONTENTS
AND AUTHOR INDEX

PERGAMON PRESS OXFORD · NEW YORK
BEIJING · FRANKFURT · SÃO PAULO · SYDNEY · TOKYO · TORONTO

NEUROSCIENCE

Chief Editors

P. G. KOSTYUK: *Department of General Physiology, A. A. Bogomoletz Institute of Physiology, Academy of Sciences, Ukrainian SSR, 4 Bogomoletz Street, Kiev 24, 252601 GSP, U.S.S.R.*

R. LLINÁS: *Department of Physiology and Biophysics, New York University School of Medicine, 550 First Avenue, New York 10016, U.S.A.*

A. D. SMITH: *Department of Pharmacology, University of Oxford, South Parks Road, Oxford OX1 3QT, U.K.*

Editorial Board

R. G. BAKER (*New York*)
P. BANKS (*Sheffield*)
K. J. BERKLEY (*Tallahassee, FL*)
D. BIESOLD (*Leipzig*)
A. BJÖRKLUND (*Lund*)
J. P. BOLAM (*Oxford*)
P. BRODAL (*Oslo*)
A. G. BROWN (*Edinburgh*)
G. TEN BRUGGENCATE (*Munich*)
J. BUREŠ (*Prague*)
R. E. BURKE (*Bethesda, MD*)
A. L. BYSOV (*Moscow*)
I. W. CHUBB (*Wollongong*)
F. CLEMENTI (*Milan*)
B. COLLIER (*Montreal*)
M. COSTA (*Adelaide*)
A. C. CUELLO (*Montreal*)
W. J. DAVIS (*Santa Cruz*)
I. M. L. DONALDSON (*Hull*)
D. EDGAR (*Munich*)
C. EDWARDS (*Bethesda, MD*)
D. S. FABER (*Buffalo, NY*)
D. M. FAMBROUGH (*Baltimore*)
V. V. FANARDJIAN (*Yerevan*)
G. GABELLA (*London*)
W. F. GANONG (*San Francisco*)
H. M. GERSCHENFELD (*Paris*)
A. M. GRAYBIEL (*Cambridge, MA*)
R. W. GUILLERY (*Oxford*)
G. HAEUSLER (*Darmstadt*)
J. HÁMORI (*Budapest*)
L. HEIMER (*Charlottesville*)
M. HERKENHAM (*Bethesda*)
D. E. HILLMAN (*New York*)
T. HÖKFELT (*Stockholm*)
E. HOLTZMAN (*New York*)
O. HORNYKIEWICZ (*Vienna*)
J. HOUNSGAARD (*Copenhagen*)
S. P. HUNT (*Cambridge*)
M. ITO (*Tokyo*)
G. JAIM-ETCHEVERRY (*Buenos Aires*)
B. E. JONES (*Montreal*)
G. JU (*Xi'an, China*)
J. S. KELLY (*Edinburgh*)
B. I. KHODOROV (*Moscow*)
G. W. KREUTZBERG (*Munich*)
K. KRNJEVIĆ (*Montreal*)
H. G. J. M. KUYPERS (*Cambridge*)
L. LUBINSKA (*Warsaw*)
L. MAFFEI (*Pisa*)
C. A. MARSDEN (*Nottingham*)
M. R. MATTHEWS (*Oxford*)
P. B. C. MATTHEWS (*Oxford*)
A. I. MATUS (*Basel*)
R. E. MCCAMAN (*Duarte, CA*)
D. K. MOREST (*Farmington, CT*)
I. G. MORGAN (*Canberra*)
J. F. MORRIS (*Oxford*)
É. MUGNAINI (*Storrs*)
W. J. H. NAUTA (*Cambridge, MA*)
F. ORREGO (*Santiago, Chile*)
M. OTSUKA (*Tokyo*)
J. M. PALACIOS (*Basle*)
S. L. PALAY (*Boston*)
R. E. PASSINGHAM (*Oxford*)
V. H. PERRY (*Oxford*)
J. M. POLAK (*London*)
P. RAKIC (*New Haven*)
H. J. RALSTON (*San Francisco*)
T. S. REESE (*Woods Hole*)
F. REINOSO-SUÁREZ (*Madrid*)
M. RÉTHELYI (*Budapest*)
P. N. RUDOMIN (*Mexico City*)
M. L. SHELANSKI (*New York*)
S. M. SHERMAN (*Stony Brook, NY*)
M. L. SHIK (*Moscow*)
M. V. SOFRONIEW (*Cambridge*)
P. SOMOGYI (*Oxford*)
C. SOTELO (*Paris*)
K. STARKE (*Freiburg*)
C. F. STEVENS (*New Haven*)
L. STJÄRNE (*Stockholm*)
C. STUMPF (*Vienna*)
K. SUZUKI (*Chapel Hill*)
R. F. THOMPSON (*Irvine, CA*)
D. A. VASILENKO (*Kiev*)
E. S. VIZI (*Budapest*)
J. VOOGD (*Leiden*)
L. VYKLICKY (*Prague*)
K. E. WEBSTER (*London*)
R. WERMAN (*Jerusalem*)
W. D. WILLIS (*Galveston*)
H. WINKLER (*Innsbruck*)
L. R. YOUNG (*Cambridge, MA*)
S. ZEKI (*London*)
H. ZIMMERMANN (*Frankfurt*)

IBRO Publications Committee

Chairman, A. D. SMITH; M. ITO, E. R. KANDEL, P. G. KOSTYUK, K. KRNJEVIĆ, R. LLINÁS, D. RICHTER.

Aims and Scope:

Neuroscience publishes papers describing the results of original research on any aspect of the scientific study of the nervous system. Since one of the chief aims of the journal is to promote communication between neuroscientists, the type of paper most suitable for publication is that in which new observations are clearly and succinctly reported and in which the purpose of the study is made meaningful to scientists of other disciplines. Any paper, however short, will be considered for publication provided that it reports significant, new and carefully confirmed findings with full experimental details. For *Instructions to Authors* see Vol. 23, No. 1, pp. i–iii.

Production Controller: K. B. DAY. *Editorial Assistant:* S. J. RUSSELL.

Publishing, Subscription and Advertising Offices: Headington Hill Hall, Oxford OX3 0BW (Oxford 64881).
Published monthly (four volumes per annum).
Annual institutional rate (1988) *DM* 2700.
Two-year institutional rate (1988/89) *DM* 5130.
Personal subscription rate for those whose library subscribes at the regular rate (1988) *DM* 231.
Prices are subject to change without notice.
Members of the International Brain Research Organization may order personal subscriptions at a concessional rate and details of these rates are available on request. Airmail Subscription extra. Subscription enquiries from customers in North America should be sent to: Pergamon Journals Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A., and for the remainder of the world to: Pergamon Journals Ltd, Headington Hill Hall, Oxford OX3 0BW, U.K.

Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index at the end of the subscription year.

Copyright © 1987 IBRO
For Copyright details, see Back Cover

LIST OF CONTENTS

VOLUME 23 NUMBER 1 OCTOBER 1987

COMMENTARY

M. Herkenham — Mismatches between neurotransmitter and receptor localizations in brain: observations and implications — 1

RESEARCH PAPERS

J. F. Soechting and **C. A. Terzuolo** — Organization of arm movements. Motion is segmented — 39

J. F. Soechting and **C. A. Terzuolo** — Organization of arm movements in three-dimensional space. Wrist motion is piecewise planar — 53

J. Delacour, O. Houcine and **B. Talbi** — "Learned" changes in the responses of the rat barrel field neurons — 63

O. Robain, G. Barbin, Y. Ben-Ari, F. Rozenberg and **A. Prochiantz** — GABAergic neurons of the hippocampus: development in homotopic grafts and in dissociated cell cultures — 73

J. Delacour and **O. Houcine** — Conditioning to time: evidence for a role of hippocampus from unit recording — 87

A. Śmiałowski and **M. Bijak** — Excitatory and inhibitory action of dopamine on hippocampal neurons *in vitro*. Involvement of D_2 and D_1 receptors — 95

H. J. Groenewegen, E. Vermeulen-Van der Zee, A. te Kortschot and **M. P. Witter** — Organization of the projections from the subiculum to the ventral striatum in the rat. A study using anterograde transport of *Phaseolus vulgaris* leucoagglutinin — 103

C. G. Dotti, G. A. Banker and **L. I. Binder** — The expression and distribution of the microtubule-associated proteins tau and microtubule-associated protein 2 in hippocampal neurons in the rat *in situ* and in cell culture — 121

R. A. Calvert, P. L. Woodhams and **B. H. Anderton** — Localization of an epitope of a microtubule-associated protein 1x in outgrowing axons of the developing rat central nervous system — 131

K. E. Nikolarakis, O. F. X. Almeida and **A. Herz** — Feedback inhibition of opioid peptide release in the hypothalamus of the rat — 143

J-M. Arrang, M. Garbarg and **J-C. Schwartz** — Autoinhibition of histamine synthesis mediated by presynaptic H_3-receptors — 149

R. Artymyshyn, T. C. Eckenrode and **M. Murray** — Opiate binding sites in the interpeduncular nucleus of the rat: normal distribution and the effects of fasciculus retroflexus lesions — 159

D. Menetrey and **A. I. Basbaum** — The distribution of substance P-, enkephalin- and dynorphin-immunoreactive neurons in the medulla of the rat and their contribution to bulbospinal pathways — 173

J. P. Kessler, E. Moyse, P. Kitabgi, J. P. Vincent and **A. Beaudet** — Distribution of neurotensin binding sites in the caudal brainstem of the rat: a light microscopic radioautographic study — 189

D. Lorton and **J. N. Davis** — The distribution of beta-1- and beta-2-adrenergic receptors of normal and reeler mouse brain: an *in vitro* autoradiographic study — 199

J. N. Payne	Cerebellar afferents from the lateral reticular nucleus in the rat	211
J. Jimenez-Castellanos and **A. M. Graybiel**	Subdivisions of the dopamine-containing A8–A9–A10 complex identified by their differential mesostriatal innervation of striosomes and extrastriosomal matrix	223
V. Perciavalle	Substantia nigra influences on the reticulospinal neurons: an electrophysiological and ionophoretic study in cats and rats	243
R. T. McCabe, G. R. Hanson, T. M. Dawson, J. K. Wamsley and **J. W. Gibb**	Methamphetamine-induced reduction in D_1 and D_2 dopamine receptors as evidenced by autoradiography: comparison with tyrosine hydroxylase activity	253
N. Kojima and **I. Kanazawa**	Possible neurotransmitters of the dorsal column afferents: effects of dorsal column transection in the cat	263
S. J. Marsh, C. E. Stansfeld, D. A. Brown, R. Davey and **D. McCarthy**	The mechanism of action of capsaicin on sensory C-type neurons and their axons *in vitro*	275
D. Weissmann, M. F. Belin, M. Aguera, C. Meunier, M. Maitre, C. D. Cash, M. Ehret, P. Mandel and **J. F. Pujol**	Immunohistochemistry of tryptophan hydroxylase in the rat brain	291
O. Hardy, E. Audinat and **D. Jassik-Gerschenfeld**	Electrophysiological properties of neurons recorded intracellularly in slices of the pigeon optic tectum	305
P. Renner, C. G. Caratsch, P. G. Waser, P. Lazarovici and **N. Primor**	Presynaptic effects of the Pardaxins, polypeptides isolated from the gland secretion of the flatfish *Pardachirus marmoratus*	319
A. Wada, M. Arita, H. Kobayashi and **F. Izumi**	Binding of [^{3}H]saxitoxin to the voltage-dependent Na channels and inhibition of ^{22}Na influx in bovine adrenal medullary cells	327
B. H. Peters and **N. M. Tyrer**	Electron microscopy of serotonin-immunoreactive neuron branches and terminals in the locust central nervous system	333
J. H. Rogers and **S. P. Hunt**	Carbonic anhydrase-II messenger RNA in neurons and glia of chick brain: mapping by *in situ* hybridization	343
M. I. Chuah and **D. R. Zheng**	Olfactory marker protein is present in olfactory receptor cells of human fetuses	363
D. E. Hartter, P. R. Burton and **L. A. Laveri**	Distribution and calcium-sequestering ability of smooth endoplasmic reticulum in olfactory axon terminals of frog brain	371
BOOK REVIEW **M. E. Appleyard**	*Dynamics of Cholinergic Function*	387
SOFTWARE SURVEY SECTION		I
VOLUME 23 NUMBER 2		NOVEMBER 1987
COMMENTARIES **C. B. Saper, B. H. Wainer** and **D. C. German**	Axonal and transneuronal transport in the transmission of neurological disease: potential role in system degenerations, including Alzheimer's disease	389

C. Koch	The action of the corticofugal pathway on sensory thalamic nuclei: a hypothesis	399
RESEARCH PAPERS		
H. E. Scharfman and **J. M. Sarvey**	Responses to GABA recorded from identified rat visual cortical neurons	407
J. P. Kim and **D. W. Choi**	Quinolinate neurotoxicity in cortical cell culture	423
W. Kamphuis, W. J. Wadman, R. M. Buijs and **F. H. Lopes da Silva**	The development of changes in hippocampal GABA immunoreactivity in the rat kindling model of epilepsy: a light microscopic study with GABA antibodies	433
T. C. Pellmar	Peroxide alters neuronal excitability in the CA1 region of guinea-pig hippocampus *in vitro*	447
J. C. Hirsch and **Y. Burnod**	A synaptically evoked late hyperpolarization in the rat dorsolateral geniculate neurons *in vitro*	457
A. Nosjean, M. Arluison and **R. F. Laguzzi**	Increase in paradoxical sleep after destruction of serotoninergic innervation in the nucleus tractus solitarius of the rat	469
B. C. Robertson, D. W. Hommer and **L. R. Skirboll**	Electrophysiological evidence for a non-opioid interaction between dynorphin and GABA in the substantia nigra of the rat	483
R. Gardette, M. Krupa and **F. Crepel**	Differential effects of serotonin on the spontaneous discharge and on the excitatory amino acid-induced responses of deep cerebellar nuclei neurons in rat cerebellar slices	491
Y. Tillet	Immunocytochemical localization of serotonin-containing neurons in the myelencephalon, brainstem and diencephalon of the sheep	501
T. Nakazato	Locus coeruleus neurons projecting to the forebrain and the spinal cord in the cat	529
J.-L. Martin, M. M. Dietl, P. R. Hof, J. M. Palacios and **P. J. Magistretti**	Autoradiographic mapping of [mono[^{125}I]iodo-Tyr^{10}, MetO^{17}]vasoactive intestinal peptide binding sites in the rat brain	539
P. Kontro and **S. S. Oja**	Co-operativity in sodium-independent taurine binding to brain membranes in the mouse	567
W. A. Staines, P. E. Daddona and **J. I. Nagy**	The organization and hypothalamic projections of the tuberomammillary nucleus in the rat: an immunohistochemical study of adenosine deaminase-positive neurons and fibers	571
B. A. Bannatyne, D. J. Maxwell and **A. G. Brown**	Fine structure of synapses associated with characterized postsynaptic dorsal column neurons in the cat	597
C. N. Christakos, U. Windhorst, R. Rissing and **J. Meyer-Lohmann**	Frequency response of spinal Renshaw cells activated by stochastic motor axon stimulation	613
M. Takata, N. Tomomune and **T. Nagahama**	Corticofugal inhibitory effects on lingually induced postsynaptic potentials in cat hypoglossal motoneurons	625

L. Persegol, R. Palisses and **D. Viala**	Different mechanisms involved in supraspinal and spinal reflex regulation of phrenic activity through chest movements	631
D.-F. Chen, M. Bianchetti and **M. Wiesendanger**	The adrenergic agonist tizanidine has differential effects on flexor reflexes of intact and spinalized rat	641
K. Inenaga and **W. T. Mason**	γ-Aminobutyric acid modulates chloride channel activity in cultured primary bovine lactotrophs	649
P. Cobbett, C. D. Ingram and **W. T. Mason**	Voltage-activated currents through calcium channels in normal bovine lactotrophs	661
K. Racké, M. Holzbauer, D. F. Sharman and **T. R. Cooper**	$GABA_A$ and $GABA_B$ receptor-mediated inhibition of release of 5-hydroxytryptamine in the intermediate lobe of the rat pituitary gland	679
S. Terashima	Substance P-like immunoreactive fibers in the trigeminal sensory nuclei of the pit viper, *Trimeresurus flavoviridis*	685
X.-Y. Hua, E. Theodorsson–Norheim, J. M. Lundberg, A.-C. Kinn, T. Hökfelt and **A. C. Cuello**	Co-localization of tachykinins and calcitonin gene-related peptide in capsaicin-sensitive afferents in relation to motility effects on the human ureter *in vitro*	693
B. H. Peters, S. V. Butler and **N. M. Tyrer**	Morphology, ultrastructure and synapse distribution of putative serotonergic salivary neurons in the locust	705
I. S. Zakharov and **P. M. Balaban**	Neural mechanisms of age-dependent changes in avoidance behaviour of the snail *Helix lucorum*	721
M. A. Moskowitz, K. Saito, L. Brezina and **J. Dickson**	Nerve fibers surrounding intracranial and extracranial vessels from human and other species contain dynorphin-like immunoreactivity	731
A. B. Ribera and **W. L. Nastuk**	Ruthenium Red reduces acetylcholine sensitivity and increases desensitization at the frog neuromuscular junction	739
M. E. Kriebel and **G. D. Pappas**	Effect of hypertonic saline on quantal size and synaptic vesicles in identified neuromuscular junction of the frog	745
M. E. Kriebel and **I. Motelica-Heino**	Description of the sub-miniature endplate potential distribution, determination of subunit size and number of subunits in the adult frog neuromuscular bell-miniature endplate potential	757
J. D. Black and **J. O. Dolly**	Selective location of acceptors for botulinum neurotoxin A in the central and peripheral nervous systems	767
P. G. Smith, J. W. Bruckert and **E. Mills**	Reinnervation of Müller's smooth muscle by atypical sympathetic pathways following neonatal ganglionectomy in the rat: structural and functional investigations of enhanced neuroplasticity	781

VOLUME 23 NUMBER 3 DECEMBER 1987

COMMENTARIES

F. H. Gage, J. A. Wolff, M. B. Rosenberg, L. Xu, J.-K. Yee, C. Shults and **T. Friedmann**	Grafting genetically modified cells to the brain: possibilities for the future	795
J. C. Holstege and **H. G. J. M. Kuypers**	Brainstem projections to spinal motoneurons: an update	809
F. Berkenbosch and **F. J. H. Tilders**	A quantitative approach to cross-reaction problems in immunocytochemistry	823

RESEARCH PAPERS

T. Hökfelt, J. Fahrenkrug, G. Ju, S. Ceccatelli, Y. Tsuruo, B. Meister, V. Mutt, M. Rundgren, E. Brodin, L. Terenius, A.-L. Hulting, S. Werner, H. Björklund and **W. Vale**	Analysis of peptide histidine-isoleucine vasoactive intestinal polypeptide-immunoreactive neurons in the central nervous system with special reference to their relation to corticotropin releasing factor- and enkephalin-like immunoreactivities in the paraventricular hypothalamic nucleus	827
R. L. Nahin	Immunocytochemical identification of long ascending peptidergic neurons contributing to the spinoreticular tract in the rat	859
K. Herrup and **E. Trenkner**	Regional differences in cytoarchitecture of the weaver cerebellum suggest a new model for weaver gene action	871
R. de la Garza, T. J. McGuire, R. Freedman and **B. J. Hoffer**	Selective antagonism of nicotine actions in the rat cerebellum with α-bungarotoxin	887
C. E. Stansfeld, S. J. Marsh, D. N. Parcej, J. O. Dolly and **D. A. Brown**	Mast cell degranulating peptide and dendrotoxin selectively inhibit a fast-activating potassium current and bind to common neuronal proteins	893
M. W. Salter and **J. L. Henry**	Purine-induced depression of dorsal horn neurons in the cat spinal cord: enhancement by tachykinins	903
B. Ulfhake, U. Arvidsson, S. Cullheim, T. Hökfelt, E. Brodin, A. Verhofstad and **T. Visser**	An ultrastructural study of 5-hydroxytryptamine-, thyrotropin-releasing hormone- and substance P-immunoreactive axonal boutons in the motor nucleus of spinal cord segments L7–S1 in the adult cat	917
M. Vitadello, C. Triban, M. Fabris, M. Donà, A. Gorio and **S. Schiaffino**	A developmentally regulated isoform of 150,000 molecular weight neurofilament protein specifically expressed in autonomic and small sensory neurons	931
E. Pinard, A. S. Rigaud, D. Riche, R. Naquet and **J. Seylaz**	Continuous determination of the cerebrovascular changes induced by bicuculline and kainic acid in unanaesthetized spontaneously breathing rats	943
D. B. Clifford, J. W. Olney, A. Maniotis, R. C. Collins and **C. F. Zorumski**	The functional anatomy and pathology of lithium–pilocarpine and high-dose pilocarpine seizures	953
P. G. H. Clarke and **J.-C. Nussbaumer**	A stain for ischaemic or excessively stimulated neurons	969
C. M. Kemper, D. T. O'Connor and **K. N. Westlund**	Immunocytochemical localization of dopamine-β-hydroxylase in neurons of the human brain stem	981
T. Wichmann, R.-B. Illing and **K. Starke**	Evidence for a neurotransmitter function of acetylcholine in rabbit superior colliculus	991

G. H. Fletcher and **M. S. Starr**	Role of the substantia nigra in the expression of dopamine D_1 receptor-mediated and D_2 receptor-mediated behaviours	1001
P. B. S. Clarke, D. W. Hommer, A. Pert and **L. R. Skirboll**	Innervation of substantia nigra neurons by cholinergic afferents from pedunculopontine nucleus in the rat: neuroanatomical and electrophysiological evidence	1011
A. Śmiałowski and **M. Bijak**	Repeated treatment with imipramine enhances the excitatory response of hippocampal neurons to dopamine	1021
C. M. Waters, S. P. Hunt, P. Jenner and **C. D. Marsden**	An immunohistochemical study of the acute and long-term effects of 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine in the marmoset	1025
C. R. Yang and **G. J. Mogenson**	Hippocampal signal transmission to the pedunculopontine nucleus and its regulation by dopamine D_2 receptors in the nucleus accumbens: an electrophysiological and behavioural study	1041
Á. Párducz, J. Toldi, F. Joó, L. Siklós and **J. R. Wolff**	Transient increase of calcium in pre- and postsynaptic organelles of rat superior cervical ganglion after tetanizing stimulation	1057
A. M. Hughes, B. J. Everitt and **J. Herbert**	Selective effects of β-endorphin infused into the hypothalamus, preoptic area and bed nucleus of the stria terminalis on the sexual and ingestive behaviour of male rats	1063
A. C. Roberts, N. D. Martensz, M. H. Hastings and **J. Herbert**	The effects of castration, testosterone replacement and photoperiod upon hypothalamic β-endorphin levels in the male Syrian hamster	1075
L. M. Zheng, N. Ravel and **F. Jourdan**	Topography of centrifugal acetylcholinesterase-positive fibres in the olfactory bulb of the rat: evidence for original projections in atypical glomeruli	1083
D. André, G. Vuillon-Cacciuttolo and **O. Bosler**	GABA nerve endings in the rat red nucleus. Combined detection with serotonin terminals using dual immunocytochemistry	1095
M. Honzawa, T. Sudoh, N. Minamino, M. Tohyama and **H. Matsuo**	Topographic localization of neuromedin U-like structures in the rat brain: an immunohistochemical study	1103
L. Schweitzer, J. M. Bell and **T. A. Slotkin**	Impaired morphological development of the dorsal cochlear nucleus in hamsters treated postnatally with α-difluoromethylornithine	1123
A. M. Tolkovsky and **H. S. Suidan**	Adenosine 5′-triphosphate synthesis and metabolism localized in neurites of cultured sympathetic neurons	1133
N. J. Grant, D. Aunis and **M. F. Bader**	Morphology and secretory activity of digitonin- and α-toxin-permeabilized chromaffin cells	1143
C. W. Bowers and **L. Kolton**	The efferent role of sensory axons in nerve-evoked contractions of bullfrog bladder	1157
S. L. Coon and **D. B. Bonar**	Pharmacological evidence that alpha$_1$-adrenoceptors mediate metamorphosis of the pacific oyster, *Crassostrea gigas*	1169